

WEST Search History

DATE: Monday, March 31, 2003

<u>Set Name</u> side by side	<u>Query</u>	<u>Hit Count</u>	<u>Set Name</u> result set
<i>DB=USPT,PGPB,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=ADJ</i>			
L25	L24 not l4	94	L25
L24	L23 not l21	94	L24
L23	L22 not l6	94	L23
L22	l1 and l5	114	L22
L21	l4 not l6	16	L21
<i>DB=USPT; PLUR=YES; OP=ADJ</i>			
L20	4853202.pn.	1	L20
L19	5015453.pn.	1	L19
L18	4156646.pn.	1	L18
L17	5177045.pn.	1	L17
L16	5352644.pn.	1	L16
L15	3296123.pn.	1	L15
L14	4138336.pn.	1	L14
L13	4400305.pn.	1	L13
L12	5128291.pn.	1	L12
L11	5200378.pn.	1	L11
L10	5298166.pn.	1	L10
L9	5397476.pn.	1	L9
L8	5407889.pn.	1	L8
L7	5702610.pn.	1	L7
<i>DB=USPT,PGPB,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=ADJ</i>			
L6	l4 and L5	20	L6
L5	strontium or sr	162678	L5
L4	l1 and L3	36	L4
L3	rubidium or rb	47732	L3
L2	((423/\$)!.CCLS.) and L1	50	L2
L1	sodium adj titanate or sodium adj nonatitanate	303	L1

END OF SEARCH HISTORY

=> d his

(FILE 'HOME' ENTERED AT 12:38:17 ON 30 MAR 2003)

FILE 'REGISTRY' ENTERED AT 12:38:31 ON 30 MAR 2003
E SODIUM NONATITANATE/CN

L1 FILE 'CAPLUS' ENTERED AT 12:39:02 ON 30 MAR 2003
12 S SODIUM NONATITANATE
S 111591-44-7/REG#

L2 FILE 'REGISTRY' ENTERED AT 12:55:51 ON 30 MAR 2003
1 S 111591-44-7/RN

L3 FILE 'CAPLUS' ENTERED AT 12:55:51 ON 30 MAR 2003
13 S L2
S 14391-63-0/REG#

L4 FILE 'REGISTRY' ENTERED AT 12:56:33 ON 30 MAR 2003
1 S 14391-63-0/RN

L5 FILE 'CAPLUS' ENTERED AT 12:56:33 ON 30 MAR 2003
271 S L4
S 14809-50-8/REG#

L6 FILE 'REGISTRY' ENTERED AT 12:56:52 ON 30 MAR 2003
1 S 14809-50-8/RN

L7 FILE 'CAPLUS' ENTERED AT 12:56:52 ON 30 MAR 2003
236 S L6
L8 1 S L7 AND L3

=>

LI ANSWER 1 OF 12 CAPLUS COPYRIGHT 2003 ACS
 AN 2003:133786 CAPLUS
 DN 138:158770
 TI Rubidium-82 generator based on sodium nonatitanate
 support, and improved separation methods for the recovery of strontium-82
 from irradiated targets
 IN Sylvester, Paul
 PA USA
 SO U.S. Pat. Appl. Publ., 12 pp.
 CODEN: USXXCO
 DT Patent
 LA English
 IC ICM A61K051-00
 NCL 424001110
 CC 63-5 (Pharmaceuticals)
 Section cross-reference(s): 8, 71

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003035772	A1	20030220	US 2001-922353	20010802
PRAI	US 2001-922353		20010802		

AB Sodium nonatitanate compns., a method using the compn.
 for recovery of ⁸²Sr from irradiated targets, and a method using the
 compn. for generating ⁸²Rb. The sodium nonatitanate
 materials of the invention are highly selective at sepg. strontium from
 solns. derived from the dissoln. of irradiated target materials, thus
 reducing target processing times. The compns. also have a very low
 affinity for rubidium, making it an ideal material for use as a ⁸²Rb
 generator. The ⁸²Rb is eluted from the sodium
 nonatitanate support using a saline soln. Sodium
 nonatitanate materials of this type both improve the recovery of
⁸²Sr and provide a safer, more effective ⁸²Rb generator system for medical
 applications such as PET.

ST rubidium 82 generator nonatitanate support strontium recovery
 IT Positron-emission tomography
 Radiopharmaceuticals
 (rubidium-82 generator based on sodium nonatitanate
 support, and improved sepn. methods for recovery of strontium-82 from
 irradiated targets)

IT 14391-63-0P, Rubidium 82, biological studies
 RL: DGN (Diagnostic use); SPN (Synthetic preparation); BIOL (Biological
 study); PREP (Preparation); USES (Uses)
 (rubidium-82 generator based on sodium nonatitanate
 support, and improved sepn. methods for recovery of strontium-82 from
 irradiated targets)

IT 111591-44-7P, Sodium titanate (Na₄Ti₉O₂₀)
 RL: NUU (Other use, unclassified); SPN (Synthetic preparation); PREP
 (Preparation); USES (Uses)
 (rubidium-82 generator based on sodium nonatitanate
 support, and improved sepn. methods for recovery of strontium-82 from
 irradiated targets)

IT 14809-50-8P, Strontium 82, preparation
 RL: PUR (Purification or recovery); PREP (Preparation)
 (rubidium-82 generator based on sodium nonatitanate
 support, and improved sepn. methods for recovery of strontium-82 from
 irradiated targets)

IT 546-68-9, Titanium isopropoxide 1310-73-2, Sodium hydroxide, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (rubidium-82 generator based on sodium nonatitanate
 support, and improved sepn. methods for recovery of strontium-82 from
 irradiated targets)

L1 ANSWER 3 OF 12 CAPLUS COPYRIGHT 2003 ACS
 AN 1999:625570 CAPLUS
 DN 131:292395
 TI The removal of strontium from simulated Hanford tank wastes containing complexants
 AU Sylvester, Paul; Clearfield, Abraham
 CS Department of Chemistry, Texas A and M University, College Station, TX, 77842-3012, USA
 SO Separation Science and Technology (1999), 34(13), 2539-2551
 CODEN: SSTEDS; ISSN: 0149-6395
 PB Marcel Dekker, Inc.
 DT Journal
 LA English
 CC 71-11 (Nuclear Technology)
 AB Two inorg. ion-exchange materials, a sodium nonatitanate and a sodium titanate, were evaluated for the removal of strontium from two simulated Hanford tank wastes, both of which contained substantial amts. of complexing agents. In simulant 101-SY, both exchangers gave distribution coeffs. (Kds) <220 mL/g at a vol.-to-mass ratio of 200. However, in a second simulant, 107-AN, the titanate gave a Kd of 2240 mL/g while the nonatitanate gave a similar Kd to the value obtained in the 101-SY simulant. The reason for the difference in behavior was detd. to be the concn. of calcium in the waste simulants. A high calcium concn. (as found in 107-AN) resulted in strontium, previously chelated by EDTA and other complexants, being released into soln. and absorbed by the titanate. Consequently, by adding sufficient calcium to 101-SY simulant to sat. the EDTA present, it proved possible to improve the strontium Kds for the titanate from 215 mL/g to in excess of 8000 mL/g. The titanate exhibited a high selectivity for calcium in comparison to the titanate, and thus the high concns. of calcium in the waste simulants competed with the strontium ions for the available ion-exchange sites and resulted in low Sr Kds. As expected, Kds for the titanate showed little improvement, and the addn. of calcium only resulted in a modest increase from 185 to 395 mL/g. Waste generation is minimal, so the addn. of calcium to the tank wastes to facilitate the removal of strontium by ion exchange is an economical approach to the remediation of complexant-bearing Hanford tank wastes.
 ST radioactive waste Hanford tank strontium removal; complexant Hanford tank radioactive waste strontium removal
 IT High-level radioactive wastes
 (liq.; removal of strontium from simulated Hanford tank wastes contg. complexants)
 IT Cation exchangers
 Complexing agents
 Partition
 (removal of strontium from simulated Hanford tank wastes contg. complexants)
 IT 7631-99-4, Sodium nitrate, uses
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
 (removal of strontium from simulated Hanford tank wastes contg. complexants)
 IT 60-00-4, EDTA, processes 77-92-9, processes 79-14-1, processes 139-13-9 142-73-4 150-39-0, HEDTA 526-95-4, D-Gluconic acid 7440-70-2, Calcium, processes 13477-34-4, Calcium nitrate tetrahydrate
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (removal of strontium from simulated Hanford tank wastes contg. complexants)
 IT 7440-24-6, Strontium, processes
 RL: PEP (Physical, engineering or chemical process); REM (Removal or disposal); PROC (Process)
 (removal of strontium from simulated Hanford tank wastes contg.

complexants)

IT 117314-20-2 159076-88-7

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(removal of strontium from simulated Hanford tank wastes contg. complexants)

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Ahearne, J; Phys Today 1997, V50, P32
- (2) Anon; Personal Communication from M Johnson BNFL Inc
- (3) Behrens, E; Environ Sci Technol 1998, V32, P101 CAPLUS
- (4) Behrens, E; Science and Technology for Disposal of Radioactive Tank Wastes In Press
- (5) Cahill, R; Ph D Dissertation Texas A&M University 1996
- (6) Keller, J; Proceedings of the First Hanford Separation Science Workshop (Report PNL-SA-21775) 1993, PI.35
- (7) Lehto, J; J Chem Soc Dalton Trans 1989, V1, P101
- (8) Lehto, J; J Radioanal Nucl Chem Lett 1987, V118, P1 CAPLUS
- (9) Lehto, J; J Solid State Chem 1988, V73, P98
- (10) Lehto, J; Radiochem Radioanal Lett 1981, V46, P381 CAPLUS
- (11) Levi, B; Phys Today 1992, V45, P17
- (12) Poojary, D; Chem Mater 1994, V6, P2364 CAPLUS
- (13) Stark, J; Chemistry Data Handbook 1982, V2nd ed
- (14) Sylvester, P; Sep Sci Technol 1999, V34, P1981 CAPLUS
- (15) Sylvester, P; Unpublished Results
- (16) Welcher, F; The Analytical Uses of Ethylenediamine Tetraacetic Acid 1958, P6
- (17) Zorpette, G; Sci Am 1996, P88 CAPLUS

=>

L1 ANSWER 4 OF 12 CAPLUS COPYRIGHT 2003 ACS
 AN 1999:500718 CAPLUS
 DN 131:174295
 TI Inorganic ion exchange materials for the removal of strontium from simulated Hanford tank wastes
 AU Sylvester, Paul; Behrens, Elizabeth A.; Graziano, Gina M.; Clearfield, Abraham
 CS Department of Chemistry, Texas A and M University, College Station, TX, 77842-3012, USA
 SO Special Publication - Royal Society of Chemistry (1999), 239 (Advances in Ion Exchange for Industry and Research), 288-297
 CODEN: SROCDO; ISSN: 0260-6291
 PB Royal Society of Chemistry
 DT Journal
 LA English
 CC 60-3 (Waste Treatment and Disposal)
 Section cross-reference(s): 8, 71
 AB In the last 50 yr, large amts. of high level radioactive wastes have been produced at the Hanford nuclear site, Washington State, as a result of chem. extn. processes designed to sep. ²³⁹Pb from irradiated U fuel. These wastes, stored in steel-lined tanks, are believed to contain 3 distinct phases: a salt cake at the top of the tank; an alk. supernate; and a metal hydroxide-rich sludge at the bottom. In these wastes, Sr predominantly occurs in the sludges but is also entrained within the salt cake and alk. supernate. The synthesis and evaluation of a titanasilicate pharmacosiderite material, a sodium nonatitanate, and a sodium titanasilicate, were studied for their effectiveness in removing Sr from 2 simulated Hanford tank wastes using batch techniques and column studies. All materials were synthesized in highly basic conditions, making them stable in alk. tank wastes. Sodium nonatitanate, NaTi, and sodium titanasilicate, NaTS, were highly efficient at removing Sr from the simulated wastes, with >99.9% total Sr removed by both materials in batch expts. Column studies confirmed the high affinity of both sodium materials for Sr in the presence of high alky. and high inert salt concns., but column blockage proved problematic to salt pptn. within the columns and tubing. The potassium pharmacosiderite, did not perform as well as either NaTS or NaTi in any waste simulant; however, this material was more suitable to remove Sr and Cs from groundwater and other process wastes with lower total ionic strength.
 ST strontium removal simulated Hanford tank waste; sodium nonatitanate sodium titanasilicate strontium removal; potassium pharmacosiderite removal strontium Hanford tank waste; ion exchange treatment simulated Hanford tank waste
 IT Ion exchange
 (batch and column study evaluation of ionic strength effect on inorg. ion exchange materials to remove strontium from simulated Hanford tank wastes)
 IT Wastewater treatment
 (ion exchange; batch and column study evaluation of ionic strength effect on inorg. ion exchange materials to remove strontium from simulated Hanford tank wastes)
 IT Nuclear power
 (wastes from; batch and column study evaluation of ionic strength effect on inorg. ion exchange materials to remove strontium from simulated Hanford tank wastes)
 IT 159076-88-7P 176744-54-0P
 RL: NUU (Other use, unclassified); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (batch and column study evaluation of ionic strength effect on inorg. ion exchange materials to remove strontium from simulated Hanford tank wastes)

IT 14158-27-1, Strontium-89, processes
RL: PEP (Physical, engineering or chemical process); POL (Pollutant); REM
(Removal or disposal); OCCU (Occurrence); PROC (Process)
(batch and column study evaluation of ionic strength effect on inorg.
ion exchange materials to remove strontium from simulated Hanford tank
wastes)

IT 117314-20-2P
RL: NUU (Other use, unclassified); PRP (Properties); SPN (Synthetic
preparation); PREP (Preparation); USES (Uses)
(ion exchange material; batch and column study evaluation of ionic
strength effect on inorg. ion exchange materials to remove strontium
from simulated Hanford tank wastes)

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

- (1) Amphlett, C; Inorganic Ion Exchangers 1964
- (2) Anon; Personal Communication from M Johnson
- (3) Behrens, E; Environ Sci Technol 1998, V32, P101 CAPLUS
- (4) Behrens, E; PhD Thesis, Texas A&M University 1997
- (5) Behrens, E; Science and Technology for Disposal of Radioactive Tank Wastes 1998
- (6) Bortun, A; Solv Extr & Ion Exch 1996, V14, P341 CAPLUS
- (7) Filina, L; Russ J Appl Chem 1995, V68, P665
- (8) Graziano, G; MS Dissertation, Texas A&M University 1998
- (9) Helfferich, F; Ion Exchange 1962
- (10) Kullberg, L; Solv Extr & Ion Exch 1989, V7, P527 CAPLUS
- (11) Lehto, J; J Radioanal Nucl Chem Letters 1987, V118, P1 CAPLUS
- (12) Nenoff, T; Environ Sci Technol 1996, V30, P3630 CAPLUS
- (13) Paulus, W; Nature 1992, V357, P571 CAPLUS
- (14) Poojary, D; Chem Mater 1994, V6, P2364 CAPLUS
- (15) Poojary, D; Inorg Chem 1996, V35, P6131 CAPLUS
- (16) Sylvester, P; Solv Extr & Ion Exch 1998, V16(6), P1527 CAPLUS

=>

L1 ANSWER 5 OF 12 CAPLUS COPYRIGHT 2003 ACS
 AN 1999:467297 CAPLUS
 DN 131:162459
 TI An assessment of inorganic ion-exchange materials for the removal of strontium from simulated Hanford tank wastes
 AU Sylvester, Paul; Behrens, Elizabeth A.; Graziano, Gina M.; Clearfield, Abraham
 CS Department of Chemistry, Texas A and M University, College Station, TX, 77842-3012, USA
 SO Separation Science and Technology (1999), 34(10), 1981-1992
 CODEN: SSTEDS; ISSN: 0149-6395
 PB Marcel Dekker, Inc.
 DT Journal
 LA English
 CC 71-11 (Nuclear Technology)
 Section cross-reference(s): 68
 AB Several inorg. ion-exchange materials were evaluated for the removal of strontium from two simulated Hanford tank wastes (NCAW and 101SY-Cs5) using static batch expts. Sodium titanium silicate, $\text{Na}_2\text{Ti}_2\text{O}_3\text{SiO}_4 \cdot 2\text{H}_2\text{O}$ (NaTS), was the best material in NCAW with a K_d of 2.7 .times. 105 mL/g at a vol.-to-mass ratio of 200:1. In the 101SY-Cs5 simulant, strontium extn. was more difficult due to the presence of complexants and consequently K_d s were greatly reduced. Sodium nonatitanate, NaTi, performed best in the presence of these complexants and gave a K_d of 295 mL/g, though none of the materials performed particularly well. Pellets suitable for column studies were synthesized and the ion exchangers evaluated in column studies. Breakthrough curves correlated well with the K_d s obtained from batch expts. with the sodium titanium silicate performing best in NCAW and a pelletized form of sodium nonatitanate performing best in 101SY-Cs5. Both the sodium titanate and the sodium titanate silicate performed better than IONSIV IE-911, a com. available ion exchanger, in the NCAW simulant, and consequently could be used for the removal of 90Sr from highly alk. tank wastes.
 ST inorg exchanger strontium removal Hanford tank waste; radioactive waste strontium removal inorg exchanger; alk tank waste Hanford strontium removal inorg exchanger
 IT Cation exchangers
 Partition
 Radioactive wastes
 (assessment of inorg. exchanger for the removal of strontium from simulated highly alk. Hanford tank wastes)
 IT 7440-24-6, Strontium, processes 14158-27-1, Strontium-89, processes
 RL: PEP (Physical, engineering or chemical process); REM (Removal or disposal); PROC (Process)
 (assessment of inorg. exchanger for the removal of strontium from simulated highly alk. Hanford tank wastes)
 IT 117314-20-2 159076-88-7 176744-52-8 176744-54-0 197099-21-1, IONSIV IE-911
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (assessment of inorg. exchanger for the removal of strontium from simulated highly alk. Hanford tank wastes)
 RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE
 (1) Amphlett, C; Inorganic Ion Exchangers 1964
 (2) Anon; Personal Communication from M Johnson
 (3) Anthony, R; WO 94/19277 1994 CAPLUS
 (4) Behrens, E; Chem Mater 1996, V8, P1236 CAPLUS
 (5) Behrens, E; Chem Mater Submitted
 (6) Behrens, E; Environ Sci Technol 1998, V32, P101 CAPLUS
 (7) Behrens, E; PhD Thesis, Texas A&M University 1997

- (8) Behrens, E; Science and Technology for Disposal of Radioactive Tank Wastes 1998, P287 CAPLUS
- (9) Bortun, A; Solv Extr Ion Exch 1996, V14, P341 CAPLUS
- (10) Clearfield, A; J Solid State Chem 1988, V73, P98 CAPLUS
- (11) Filina, L; Russ J Appl Chem 1995, V68, P665
- (12) Helfferich, F; Ion Exchange 1962
- (13) Keller, J; First Hanford Separation Science Workshop 1993, PI.35
- (14) Klavetter, E; Waste Management Symposia '94 (WM '94) 1994
- (15) Kullberg, L; Solv Extr Ion Exch 1989, V7, P527 CAPLUS
- (16) Lehto, J; J Radioanal Nucl Chem Lett 1987, V118, P1 CAPLUS
- (17) Nenoff, T; Environ Sci Technol 1996, V30, P3630 CAPLUS
- (18) Paulus, W; Nature 1992, V357, P571 CAPLUS
- (19) Poojary, D; Chem Mater 1994, V6, P2364 CAPLUS
- (20) Poojary, D; Inorg Chem 1996, V35, P6131 CAPLUS

=>

L1 ANSWER 6 OF 12 CAPLUS COPYRIGHT 2003 ACS
AN 1999:147030 CAPLUS
TI The removal of strontium from complexant-bearing hanford tank simulants
AU Sylvester, Paul; Clearfield, A.
CS Lynntech Inc., College Station, TX, 77840, USA
SO Book of Abstracts, 217th ACS National Meeting, Anaheim, Calif., March
21-25 (1999), I&EC-203 Publisher: American Chemical Society, Washington,
D. C.
CODEN: 67GHA6
DT Conference; Meeting Abstract
LA English
AB The use of ion exchangers to remove strontium from simulated Hanford tank
wastes contg. high concns. of complexants has proved to be inefficient.
The strontium is strongly complexed, particularly by EDTA, and is not
readily extd. from soln. Two Sr-selective ion materials, a sodium
nonatitanate and a sodium titanate, gave Sr distribution
coeffs. (Kds) in tank 101-SY simulant of approx., 200 mL/g which
corresponds to only about 50% Sr removal. One methodol. to improve the Sr
Kds is the addn. of calcium to the simulant to sat. the complexants and
thus make the Sr available for removal by ion exchange. Using this
method, Sr Kds of up to 8000 mL/g were obtained for the sodium
titanate while the sodium nonatitanate showed
very little improvement. An alternative method to remove strontium is to
destroy the complexants using chem. oxidn. techniques followed by ion
exchange.

=>

<=

L1 ANSWER 7 OF 12 CAPLUS COPYRIGHT 2003 ACS
 AN 1999:4588 CAPLUS
 DN 130:174269
 TI Evaluation of a sodium nonatitanate, sodium
 titanate, and pharmacosiderite-type ion exchangers for strontium
 removal from DOE waste and Hanford N-springs groundwater simulants
 AU Behrens, Elizabeth A.; Sylvester, Paul; Graziano, Gina; Clearfield,
 Abraham
 CS Department of Chemistry, Texas A and M University, College Station, TX,
 77843, USA
 SO Science and Technology for Disposal of Radioactive Tank Wastes,
 [Proceedings of the American Chemical Society Symposium on Science and
 Technology for Disposal of Radioactive Tank Wastes], Las Vegas, Nev.,
 Sept. 7-11, 1997 (1998), Meeting Date 1997, 287-299. Editor(s): Schulz,
 Wallace W.; Lombardo, Nicholas J. Publisher: Plenum, New York, N. Y.
 CODEN: 67BHAF
 DT Conference
 LA English
 CC 71-11 (Nuclear Technology)
 Section cross-reference(s): 61, 68
 AB Preliminary data suggest that the nonatitanate and the sodium
 titanate are the best materials for Sr ($K_d > 200,000$ and 269,500 mL/g,
 resp.) removal from the NCAW and DSSF-7 waste simulant. Several materials
 are suitable for Sr removal for groundwater remediation applications. The
 sodium titanate produced the highest Sr K_d values in the N-springs
 simulant.
 ST cation exchanger strontium removal; radioactive waste strontium removal
 cation exchanger; groundwater pollution strontium removal cation exchanger
 IT Cation exchangers
 Groundwater pollution
 Partition
 Radioactive wastes
 (ion exchanger evaluation for strontium removal from DOE waste and
 Hanford N-springs groundwater simulants)
 IT Chabazite-type zeolites
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (ion exchanger evaluation for strontium removal from DOE waste and
 Hanford N-springs groundwater simulants)
 IT Pelletization
 (ion exchanger evaluation for strontium removal from DOE waste and
 Hanford N-springs groundwater simulants in relation to)
 IT 7440-24-6, Strontium, processes 14158-27-1, Strontium-89, processes
 RL: PEP (Physical, engineering or chemical process); REM (Removal or
 disposal); PROC (Process)
 (ion exchanger evaluation for strontium removal from DOE waste and
 Hanford N-springs groundwater simulants)
 IT 12173-10-3, Clinoptilolite 117314-20-2 159076-84-3
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (ion exchanger evaluation for strontium removal from DOE waste and
 Hanford N-springs groundwater simulants)
 IT 176744-54-0
 RL: PEP (Physical, engineering or chemical process); TEM (Technical or
 engineered material use); PROC (Process); USES (Uses)
 (pharmacosiderite-phase; ion exchanger evaluation for strontium removal
 from DOE waste and Hanford N-springs groundwater simulants)
 RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE
 (1) Bidear, J; J Non-Cryst Solids 1982, V48, P385
 (2) Brow, R; Phys Chem Glass 1991, V32(5), P188 CAPLUS
 (3) Bunker, B; Sludge compositions

- (4) Cunnane, J; Mat Res Soc Proc 1993, V294, P225 CAPLUS
- (5) Day, D; Final Technical Report for Contract No 276822-A-F1 1995
- (6) Day, D; Final Technical Report for Contract No AF-0923 1994
- (7) Ijjaali, M; Eur J Solid State Inorg Chem 1991, V28, P983 CAPLUS
- (8) Illman, D; Chem&Eng 1993, P9
- (9) Materials Characterization Center; Nuclear Materials Handbook 1982,
DOE/TIC-11400
- (10) Matzke, H; J Nuc Mat 1993, V201, P295 CAPLUS
- (11) Mellinger, G; US DOE Report PNL-4955-2 1984
- (12) Mesko, M; Masters Thesis University of Missouri-Rolla 1993
- (13) Peng, Y; Glass Tech 1991, V32(5), P166 CAPLUS
- (14) Sales, B; Mat Letters 1984, V2(4B), P301 CAPLUS
- (15) Sales, B; Science 1984, V226(4607), P45
- (16) Tooley, F; The Handbook of Glass Manufacture Volume 1 Books for Industry
1974
- (17) Yanagi, T; J Nuc Sci And Tech 1988, V25(8), P661 CAPLUS
- (18) Yu, X; to be published in J Non-Cryst Solids

=>

L1 ANSWER 8 OF 12 CAPLUS COPYRIGHT 2003 ACS
 AN 1997:757609 CAPLUS
 DN 127:350546
 TI Assessment of a Sodium Nonatitanate and
 Pharmacosiderite-Type Ion Exchanger for Strontium and Cesium Removal from
 DOE Waste Simulants
 AU Behrens, Elizabeth A.; Sylvester, Paul; Clearfield, Abraham
 CS Department of Chemistry, Texas AM University, College Station, TX, 77843,
 USA
 SO Environmental Science and Technology (1998), 32(1), 101-107
 CODEN: ESTHAG; ISSN: 0013-936X
 PB American Chemical Society
 DT Journal
 LA English
 CC 60-2 (Waste Treatment and Disposal)
 Section cross-reference(s): 71
 AB Several inorg. ion exchangers were tested for 89Sr and 137Cs removal from
 simulated DOE aq. defense wastes (NCAW and 101SY-Cs5) and a Hanford
 groundwater soln. (N-springs). The materials used in this study consisted
 of the 3-dimensional tunnel-structured pharmacosiderites
 [M3H(AO)4(BO4)3.cntdot.4-6H2O (M = H, K; A = Ti, Ge; B = Si, Ge); the
 layered Na nonatitanate, Na4Ti9O20.cntdot.xH2O; and 2 com. available
 exchangers, AW-500 and clinoptilolite]. 89Sr and 137Cs distribution
 coeff. (Kd) measurements showed that all of the synthetic exchangers
 removed .gtoreq.97% of the 89Sr from the N-springs groundwater simulant in
 a single static equilibration. This simulant also contained ppm levels of
 Ca2+, Mg2+, K+, and Na+. Similarly, many of the same materials
 efficiently removed 137Cs (>98%) from the same soln., except for Na
 titanate, which exhibited the lowest Kd of 1210 mL/g for Cs+. These
 preliminary Kd values provide an indication that these exchangers may act
 as dual Cs+ and Sr2+ sorbers for groundwater remediation applications.
 The different phases were also tested as potential exchangers for 137Cs
 and 89Sr in different nuclear waste simulants. While none of the
 materials showed little preference for 137Cs in highly basic solns. contg.
 large concns. of NaNO3, a K titanosilicate and the Na titanate yielded
 89Sr Kd values of 20 180 mL/g (DF = 91) and 235 120 mL/g (DF = 1177),
 resp.
 ST sodium nonatitanate strontium cesium wastewater
 groundwater; pharmacosiderite strontium cesium wastewater groundwater; ion
 exchanger strontium cesium wastewater groundwater
 IT Wastewater treatment
 Water purification
 (ion exchange; sodium nonatitanate and
 pharmacosiderite-type ion exchanger for strontium and cesium removal
 from wastewater and groundwater)
 IT Radioactive wastes
 (sodium nonatitanate and pharmacosiderite-type ion
 exchanger for strontium and cesium removal from wastewater and
 groundwater)
 IT Chabazite-type zeolites
 RL: NUU (Other use, unclassified); USES (Uses)
 (sodium nonatitanate and pharmacosiderite-type ion
 exchanger for strontium and cesium removal from wastewater and
 groundwater)
 IT 12173-10-3, Clinoptilolite 12256-07-4, Pharmacosiderite 61026-54-8,
 Chabazite 117314-20-2
 RL: NUU (Other use, unclassified); USES (Uses)
 (sodium nonatitanate and pharmacosiderite-type ion
 exchanger for strontium and cesium removal from wastewater and
 groundwater)
 IT 7440-24-6, Strontium, processes 7440-46-2, Cesium, processes
 10045-97-3, Cesium-137, processes 14158-27-1, Strontium-89, processes

RL: REM (Removal or disposal); PROC (Process)
(sodium nonatitanate and pharmacosiderite-type ion
exchanger for strontium and cesium removal from wastewater and
groundwater)

=>

L1 ANSWER 9 OF 12 CAPLUS COPYRIGHT 2003 ACS
 AN 1997:612668 CAPLUS
 DN 127:312297
 TI Comparison of organic and inorganic ion exchangers for the batch contact removal of cesium and strontium from simulated and actual Hanford 241-AW-101 DSSF tank waste
 AU Brown, G. N.; Bray, L. A.; Carlson, C. D.; Carson, K. J.; DesChane, J. R.; Elovich, R. J.; Hoopes, F. V.; Kurath, D. E.; Nenninger, L. L.; Tanaka, P. K.
 CS Pacific Northwest Natl. Lab., Richland, WA, 99352, USA
 SO Proceedings of the International Topical Meeting on Nuclear and Hazardous Waste Management, SPECTRUM '96, 6th, Seattle, Aug. 18-23, 1996 (1996), Volume 3, 2293-2299 Publisher: American Nuclear Society, La Grange Park, Ill.
 DT CODEN: 65AVA4
 LA Conference
 CC English
 CC 71-11 (Nuclear Technology)
 AB This report describes the evaluation of seven ion exchange materials (sodium nonatitanate (NaTi), CS-100, resorcinol-formaldehyde (R-F), SuperLig.RTM. 644, IONSIV.RTM. IE-910, IE-911, and TIE-96) for pretreatment of actual and simulated Hanford tank waste. The data can be applied to the development and evaluation of pretreatment process flowsheets. Cs and Sr batch distributions ratios (Kd), column distribution ratios ($\lambda = Kd \times \rho_b$), and decontamination factors (DF) are compared as a function of supernate:exchanger phase ratio, soln. compn., and multiple sequential contacts. The actual double shell slurry feed (DSSF) waste used was a vol. composite from tanks 101-AW (70%), 106-AP (20%) and 102-AP (10%) dild. to 4.96 \pm 0.19 M sodium with an initial Na/Cs ratio of 78,000. Simulant test were conducted at waste dilns. ranging from 7 to 0.2 M Na, over a wide range of Na/Cs mole ratios (50 to 500,000).
 ST org exchanger radionuclide removal Hanford waste; inorg exchanger radionuclide removal Hanford waste; cesium removal ion exchanger Hanford waste; strontium removal ion exchanger Hanford waste; radioactive waste removal inorg org exchanger
 IT Phenolic resins, uses
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (CS 100; comparison of org. and inorg. ion exchangers for removal of cesium and strontium from simulated and actual Hanford tank waste)
 IT Radioactive wastes
 (comparison of org. and inorg. ion exchangers for removal of cesium and strontium from simulated and actual Hanford tank waste)
 IT Sludges
 Sludges
 (radioactive; comparison of org. and inorg. ion exchangers for removal of cesium and strontium from simulated and actual Hanford tank waste)
 IT Radioactive wastes
 Radioactive wastes
 (sludges; comparison of org. and inorg. ion exchangers for removal of cesium and strontium from simulated and actual Hanford tank waste)
 IT 9003-35-4
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
 (CS 100; comparison of org. and inorg. ion exchangers for removal of cesium and strontium from simulated and actual Hanford tank waste)
 IT 7440-70-2, Calcium, processes
 RL: REM (Removal or disposal); PROC (Process)
 (comparison of org. and inorg. ion exchangers for removal metals from simulated and actual Hanford tank waste)
 IT 7440-24-6, Strontium, processes 7440-46-2, Cesium, processes

10045-97-3, Cesium 137, processes 10098-97-2, Strontium 90, processes
RL: POL (Pollutant); REM (Removal or disposal); OCCU (Occurrence); PROC
(Process)

(comparison of org. and inorg. ion exchangers for removal of cesium and
strontium from simulated and actual Hanford tank waste)

IT 24969-11-7, Resorcinol-formaldehyde copolymer 111591-44-7, Sodium
titanate (Na₄Ti₉O₂₀) 181186-61-8, Ionsiv IE 910 181186-86-7, Ionsiv
TIE 96 197099-21-1, Ionsiv IE 911 197394-24-4, SuperLig 644

RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)

(comparison of org. and inorg. ion exchangers for removal of cesium and
strontium from simulated and actual Hanford tank waste)

IT 7439-89-6, Iron, processes 7440-02-0, Nickel, processes 7440-41-7,
Beryllium, processes 7440-47-3, Chromium, processes 7440-67-7,
Zirconium, processes

RL: REM (Removal or disposal); PROC (Process)

(comparison of org. and inorg. ion exchangers for removal of metals
from simulated and actual Hanford tank waste)

=>